



Federal Railroad Administration

**49 CFR Part 232
Brake System Safety Standards for Freight
ASLRRA - Presentation**

This Page Intentionally
Left Blank

FEDERAL RAILROAD ADMINISTRATION
BRAKE SYSTEM SAFETY STANDARDS FOR FREIGHT

Agenda

Module Objectives

- Identify proper train placement of equipment with inoperative brakes based on a given scenario
- Compute the percentage of operative brakes based on a given scenario

- Apply FRA Brake System Safety Standards when inspecting freight equipment
- Identify deviations from the standards
- Determine when hand brakes must be applied on locomotives based on given scenario

- Recognize training requirements for personnel engaged in the application of Part 232
- Identify Class I, II and transfer brake test requirements using appropriate job aid

- List the events that would trigger a Single Car Test
- Differentiate between major repair and minor repair

Recognize proper installation, inspection and testing of End of Train devices

Module Content

- Safety briefing
- Pre-Test

Module 1 - Subpart A - General

- Applicability
- Definitions
- Waivers
- Responsibility for compliance
- Penalties
- Preemptive effect
- Movement of defective equipment
- Special approval procedure
- Availability of records

Practice Exercise & Debrief

Module 2 - Subpart B - General Requirements

- General requirements for all train brake systems
- General requirements for locomotives
- Air source requirements and cold weather operations
- Dynamic brake requirements
- Train handling information

Practice Exercise & Debrief

Module 3 - Subpart C - Inspection & Testing

- Training requirements
- Class I brake tests - initial terminal inspection
- Class IA brake tests - 1,000-mile inspection
- Class II brake tests - intermediate inspection
- Class III brake tests - trainline continuity inspection
- Extended haul trains
- Transfer train brake tests
- Train brake tests conducted using yard air
- Double heading and helper service

Practice Exercise & Debrief

Module 4 - Subpart D - Periodic Maintenance and Testing Requirements

- General requirements
- Single car air brake tests
- Modification of the single car air brake test procedures
- Equipment and devices used to perform single car air brake tests

Module 5 - Subpart E - End-of-Train Devices

- Design and performance standards for two-way end-of-train devices
- Operations requiring use of two-way end-of-train devices
- Inspection and testing of end-of-train devices

- Presentation debrief
- Post test

This Page Intentionally
Left Blank

**Comparison
Former Part 232 vs. New Part 232**

Old Reference	New Reference	Description
§232.1	§232.103(e)	85% operative brakes on all freight trains
§232.3	§232.103(l)	Performance specifications for freight brakes
§232.10	§232.105	General requirements for locomotives
§232.11(c)	§232.103(f)	Effective and operative brakes
§232.12(a)	§232.205	Initial Terminal/Class I test
§232.12(c)-(j)	§232.205(c)	Initial Terminal/Class I test task(s) & requirements
§232.12(b)	§232.207	1,000-mile/Class IA test
§232.12(f)	§232.205(c)(5)	PT adjust. requirements @ Initial Term./Class I test
§232.12(i)	§232.217	Brake tests using yard air
§232.13(b)&(c)	§232.211	Continuity/Class III tests
§232.13(d)	§232.209	Intermediate/Class II tests
§232.13(e)	§232.215	Transfer train tests
§232.13(f)	§232.103(n)	Securement of unattended equipment
§232.15	§232.219	Double Heading/Helper Service
§232.17	§§232.303 & 232.305	Maintenance requirements
§232.19	§232.403	One-way EOT design standards
§232.21	§232.405	Two-way EOT design and performance standards
§232.23	§232.407	Trains requiring two-way EOT devices
§232.25	§232.409	Inspection and test of EOT devices

“Table of Contents” Tab Goes
Here

**FEDERAL RAILROAD ADMINISTRATION
BRAKE SYSTEM SAFETY STANDARDS FOR FREIGHT**

Table of Contents

Subpart A - General - Module 1	Tab 1
Subpart B - General Requirements - Module 2	Tab 2
Subpart C - Inspection & Testing - Module 3	Tab 3
Subpart D - Periodic Maintenance and Testing Requirements - Module 4	Tab 4
Subpart E - End-of-Train Devices - Module 5	Tab 5
Practice Exercises	Tab 6
Technical Bulletin MP&E 98-63	Tab 7

Module 1 Tab Goes Here



Brake System Safety Standards for Freight

Subpart A – General
Module 1

Welcome to Ft. Worth ASLRRA Seminar

Rob Castiglione – R5, Deputy Regional Administrator

Jim Wilson – MP&E Specialist, Washington, DC

Tom Herrmann – Attorney, Washington DC

Module Objectives

- Identify proper train placement of equipment with inoperative brakes based on a given scenario
- Compute the percentage of operative brakes based on a given scenario

Module 1

3

Subpart A

- Scope – 232.1
- Applicability – 232.3
- Definitions – 232.5
- Waivers – 232.7
- Responsibility for compliance 232.9
- Penalties – 232.11
- Preemptive effect –232.13
- Movement of defective equip.– 232.15
- Special approval procedure – 232.17
- Availability of records – 232.19
- Information collection – 232.21

Module 1

4

Staggered Implementation Key Dates

- May 31, 2001 - All of Subpart A with the exception of “Movement of defective equipment provisions” and Subpart E, End-of-Train Devices
- August 1, 2001 – Subpart D, Periodic Maintenance & Testing Requirements
- April 1, 2004 – Subparts B, C, F and “Movement of defective equipment provisions” from Subpart A

Module 1

5

Which Railroads ?

The new Brake System Safety Standards for Freight apply only to freight railroads (excludes Subpart E – EOT’s, applies to passenger as well), operating freight trains operating over the general system of transportation

Module 1

6

Are any railroads exempt ?

- Plant railroads.
- Rapid transit operations not connected to the general system.
- Freight and other non-passenger trains of four wheel coal cars.
- Freight and other non-passenger trains of eight wheel logging cars where height from top of rail to C/L of coupler is not more than 25” as well as the locomotives used to haul this type of logging car.
- Passenger trains (see next slide).
- Tourist, scenic, historic, or excursion operations, whether on or off the general system (see next slide).

Module 1

7

Exemptions continued

- Intercity, commuter, short haul, long distance and other passenger trains operating over the general system must comply with Part 238 regulations.
- Tourist, scenic, historic, or excursion operations, on the general system must comply with the former Power Brake Regulations that now reside under Appendix B to Part 232.

Note: All passenger, freight, tourist, scenic, historic or excursion trains operating over the general system must comply with End-of-Train Device requirements contained in Subpart E of Part 232.

Module 1

8

Additional Exemptions Formerly ICC Order 13528

- Scale cars, locomotive cranes, steam shovels, pile drivers and machines of similar construction, and maintenance machines built prior to September 21, 1945.
- Export, industrial, and other cars not owned by a railroad which are not to be used in service, except for movement as shipments on their own wheels to given destinations. Such cars shall be properly identified by a card attached to each side of the car, signed by the shipper, stating that such movement is being made under the authority of this paragraph.
- Industrial and other than railroad-owned cars which are not to be used in service except for movement within the limits of a single switching district (i.e., within the limits of an industrial facility).
- Narrow-gage cars.
- Cars used exclusively in switching operations and not used in train movements within the meaning of the Federal safety appliance laws.

Module 1

9

Definitions

There are several definitions listed in this rule, we will discuss only those definitions that may impact your understanding of what we'll be attempting to impart to you today.

Module 1

10

Brake, effective

Means a brake that is capable of producing its nominally designed retarding force on the train. A car's air brake is not considered effective if it is not capable of producing its nominally designed retarding force or if its piston travel exceeds:

- 10 ½ inches for cars equipped with nominal 12-inch stroke brake cylinders; or
- The piston travel limit indicated on the stencil, sticker, or badge plate for that brake cylinder.

Brake indicator

Means a device which indicates the brake application range and indicates whether brakes are applied and released.

Brake, inoperative

Means a primary brake that, for any reason, no longer applies or releases as intended.

Brake, secondary

Means those components of the train brake system which develop supplemental brake retarding force that is not needed to stop the train within signal spacing distances or to prevent thermal damage to wheels.

Brake, primary

Means those components of the train brake system necessary to stop the train within the signal spacing distance without thermal damage to friction braking surfaces.

Module 1

15

Cold weather

Means when the ambient temperature drops below 10 degrees Fahrenheit (F) (minus 12.2 degrees Celsius).

Module 1

16

Contractor

A person under contract with the railroad or car owner.

Off air

Means not connected to a continuous source of compressed air of at least 60 pounds per square inch (psi).

Piston travel

Means the amount of linear movement of the air brake hollow rod (or equivalent) or piston rod when forced outward by movement of the piston in the brake cylinder or actuator and limited by the brake shoes being forced against the wheel or disc.

Module 1

19

Previously tested equipment

Means equipment that has received a Class I brake test pursuant to §232.205 and has not been off air for more than four hours.

Module 1

20

Primary responsibility

Means the task that a person performs at least 50 percent of the time. The totality of the circumstances will be considered on a case-by-case basis in circumstances where an individual does not spend 50 percent of the day engaged in any one readily identifiable type of activity.

Qualified mechanical inspector

Means a qualified person who has received, as a part of the training, qualification, and designation program required under §232.203:

- Instruction and training that includes "hands-on" experience (under appropriate supervision or apprenticeship) in one or more of the following functions: troubleshooting, inspection, testing, maintenance or repair of the specific train brake components and systems for which the person is assigned responsibility.
- This person shall also possess a current understanding of what is required to properly repair and maintain the safety-critical brake components for which the person is assigned responsibility. Further, the qualified mechanical inspector shall be a person whose primary responsibility includes work generally consistent with the functions listed in this definition.

Qualified person

Means a person who has received, as a part of the training, qualification, and designation program required under §232.203, instruction and training necessary to perform one or more functions required under this part.

The railroad is responsible for:

- Determining that the person has the knowledge and skills necessary to perform the required function for which the person is assigned responsibility.
- Determines the qualifications and competencies for employees designated to perform various functions in the manner set forth in this part.
- Determining the required functions for which an individual will be deemed a "qualified person" based upon the instruction and training the individual has received pursuant to §232.203 concerning a particular function.

Note: Although the rule uses the term "qualified person" to describe a person responsible for performing various functions required under this part, a person may be deemed qualified to perform some functions but not qualified to perform other functions. For example, although a person may be deemed qualified to perform the Class II/intermediate brake test required by this part, that same person may or may not be deemed qualified to perform the Class I/initial Terminal brake test or authorize the movement of defective equipment under this part.

Module 1

23

"Roll-by"

Means an inspection performed while equipment is moving.

Note: If a "roll-by" inspection is performed by the qualified inspector during the release portion of the brake test, train speed shall not exceed 10 mph. Furthermore, the qualified person participating in the "roll-by" inspection shall communicate the results of the inspection to the operator of the train.

Module 1

24

Solid block of cars

Means two or more freight cars coupled together and added to or removed from a train as a single unit.

Train, unit or train, cycle

Means a train that, except for the changing of locomotive power and the removal or replacement of defective equipment, remains coupled as a consist and continuously operates from location A to location B and back to location A.

Unattended equipment

Means equipment left standing and unmanned in such a manner that the brake system of the equipment cannot be readily controlled by a qualified person.

Responsibility for compliance

A railroad shall not:

- Use, haul, permit to be used or hauled on its line,
- Offer in interchange, or accept in interchange any train, a railroad car, or locomotive with, One or more conditions not in compliance with Part 232, unless movement is made in accordance with §232.15.

Ready for Service

A train, railroad car, or locomotive will be considered in use prior to departure but after it has received, or should have received, the inspection required for movement and is deemed ready for service.

Person vs. Railroad

The term railroad is intended to be used synonymously or interchangeably with person, meaning that failure to comply with the requirements of Part 232 could subject the railroad and/or person to FRA enforcement action.

Penalties

- FRA can assess a violation (civil penalty) on any railroad and/or person, an amount of at least \$500 to \$11,000 per violation.
- Violations against individuals must be willful in nature.
- Penalties of up to \$22,000 may be assessed where a grossly negligent violation or a pattern of repeated violations has created an imminent hazard of death or injury to persons, or has caused death or injury.
- Violation may be assessed each day the violation exists with sufficient documentation.
- Criminal penalties may be sought against any person who knowingly and willfully falsifies a record or report required by Part 232.

Module 1

31

Movement of defective equipment §232.15

Permits for the conditional movement of defective locomotive(s) or car(s) with one or more air brake related defects, **except from locations where Class I brake tests are required to be performed on the entire train and/or where the necessary repairs can be made (see next slide).**

Module 1

32

Movement of defective equipment Conditions for movement

1. The equipment is properly equipped to begin with.
2. The equipment becomes defective while it is being used by the railroad on its line or becomes defective on a connecting railroad and properly accepted in interchange for repairs in accordance with item 7 on the next slide.
3. The railroad has knowledge of the defect prior to moving it for repairs.
4. The movement of the defective equipment for repairs is from the location where the equipment is first discovered defective by the railroad.
5. The equipment cannot be repaired at the location where the railroad first discovers it to be defective.
6. The movement of the equipment is necessary to make repairs to the defective condition.

Module 1

33

Movement of defective equipment Conditions for movement – Continued

7. The location to which the equipment is being taken for repair is the nearest available location where necessary repairs can be performed on the line of the railroad where the equipment was first found to be defective or is the nearest available location where necessary repairs can be performed on the line of a connecting railroad if:
 - ✓ The connecting railroad elects to accept the defective car or locomotive for such repair; and
 - ✓ The nearest available location where necessary repairs can be performed on the line of the connecting railroad is no farther than the nearest available location where necessary repairs can be performed on the line of the railroad where the car or locomotive was found defective.

Module 1

34

Movement of defective equipment Conditions for movement – Continued

8. The movement of the defective car or locomotive for repairs is not by a train required to receive a Class I brake test on the entire train.
9. The movement of the defective car or locomotive for repairs is not in a train in which less than 85 percent of the cars have operative and effective brakes.
10. The defective car or locomotive is tagged, or information is recorded, as required.

Module 1

35

Movement of defective equipment Determinations for movement

A qualified person* shall determine:

- That it is safe to move the defective equipment, and
- The maximum safe speed and other restrictions necessary for safely conducting the movement.

* May be qualified mechanical inspector as well

Module 1

36

Movement of defective equipment Notification to crew

- The person in charge of the train in which the defective equipment is to be moved shall be notified in writing and inform all other crew members of the presence of the defective equipment and the maximum speed and other restrictions imposed.
- A copy of the tag or card described in the following slides will meet the notification of crew requirements.

Module 1

37

Movement of defective equipment Tagging

- At the location where the defect is first discovered, a tag or card shall be placed on both sides of the defective equipment, except when a locomotive, a card or tag can be placed in the cab.
- Automated reporting if approved by FRA is also acceptable.

Module 1

38

Movement of defective equipment Tagging - Information Required

The tag, card or automated (electronic) tracking system shall contain the following:

- ✓ The reporting mark and car or locomotive number.
- ✓ The name of the inspecting railroad.
- ✓ The name and job title of the inspector.
- ✓ The inspection location and date.
- ✓ The nature of each defect.
- ✓ A description of any movement restrictions.
- ✓ The destination where the equipment will be repaired; and
- ✓ The signature, or electronic identification, of the person reporting the defective condition.

Movement of defective equipment Tagging – Retention, Removal & Documentation

- An electronic or written record or a copy of each tag or card attached to or removed from a car or locomotive shall be retained for 90 days and, upon request, shall be made available within 15 calendar days for inspection by FRA.
- Each tag or card removed from a car or locomotive shall contain the date, location, reason for its removal, and the signature of the person who removed it from the piece of equipment.

Movement of defective equipment Automated Tracking System (ATS)

- An FRA approved ATS shall contain the elements previously discussed and shall be capable of being reviewed and monitored by FRA at any time to ensure the integrity of the system.
- FRA's Associate Administrator for Safety may prohibit or revoke a railroad's authority to use ATS in lieu of tagging if FRA finds that ATS is not properly secure, is inaccessible to FRA or a railroad's employees, or fails to adequately track and monitor the movement of defective equipment.

Module 1

41

Movement of defective equipment Purging or unloading Haz-mat

If a defective car is loaded with a hazardous material or contains residue of a hazardous material, the car may not be placed for unloading or purging unless unloading or purging is consistent with determinations made and restrictions imposed by the qualified person and the unloading or purging is necessary for the safe repair of the car.

Module 1

42

Movement of defective equipment Computation of % operative brakes

Calculating the percentage of operative brakes shall be determined by dividing the number of control valves that are cut-in by the total number of control valves in the train. A control valve shall not be considered cut-in if the brakes controlled by that valve are inoperative. Both cars and locomotives shall be considered when making this calculation.

Module 1

43

Movement of defective equipment Other brake related defects

Do not consider the following when calculating percentage of operative brakes:

- Inoperative secondary brake systems.
- Inoperative hand or parking brakes.
- PT in excess of Class I limits but not in excess of limits contained on stencil/badge plate.
- Overdue Single Car Test - SCT.

Module 1

44

Movement of defective equipment

Train placement – Equipment w/ Inop Brakes

- Never at the rear of the train.
- Never more than two adjoining.
- Multi-unit articulated car with more than two control valves c/o if the brakes controlled by the valves are inoperative.

Module 1

45

Movement of defective equipment

Locations where necessary repairs can be performed

The following locations should be considered when applying the guidelines presented in the next slide:

- A location where a mobile repair truck is used on a regular basis.
- A location where a mobile repair truck originates or is permanently stationed.
- A location at which a railroad performs mechanical repairs other than brake system repairs.
- A location that has an operative repair track or repair shop.

Module 1

46

Movement of defective equipment Guidelines

- The location should be accessible to persons responsible for making repairs.
- Are there hazardous conditions that affect the ability to safely make repairs of the type needed at the location?
- The nature of the repair and what will it take to fix it.
- The need for the railroad to have in place an effective means to ensure the safe and timely repair of equipment.
- Weather conditions creating a hazardous situation.
- The location doesn't need to be continuously staffed nor does it have to have the ability to effect every type of brake system repair, or perform a SCT.
- Congestion of work at the location is a non-issue.

Module 1

47

Movement of defective equipment Key Points

In determining whether a location is the nearest location where the necessary brake repairs can be made, the distance to the location is a key factor but should not be considered the determining factor. The distance to a location must be considered in conjunction with the factors and guidance outlined in the two previous slides. In addition, the following safety factors must be considered in order to optimize safety:

- The safety of the employees responsible for getting the equipment to or from a particular location, and
- The potential safety hazards involved with moving the equipment in the direction of travel necessary to get the equipment to a particular location.

Module 1

48

Movement of defective equipment

Designated repair locations

- Railroads may submit a plan establishing designated repair locations where brake system repairs can be made consistent with the guidelines, determinations and factors previously discussed.
- Changes or alternate plans with respect to designated repair locations will be considered by FRA in accordance with the special approval procedures contained in §232.17.

Module 1

49

Special approval procedure

Special approval procedures apply to the following:

- Designated repair locations – special approval plan.
- SCT alternatives – alternative standard.
- New brake systems or major upgrades to existing equipment - special approval of pre-revenue service acceptance and testing plan.

Module 1

50

Availability of records

All records associated with Part 232 shall be made available to FRA upon request

End of Module 1